The Pancreatic Treatment of Diabetes Mellitus

A thesis

by

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Until quite recently, there were a certain number of diseases whose treatment baffled the skill of the physician. Within the last few years, however, great alterations have been made in this branch of medicine, and many important and useful additions have been made to our Therapeutic knowledge. I refer more particularly to the administration (internally, or by hypodermic injection) of the active principle of certain glands of animals, and to the inoculation of toxic serum.

There are some who hold, with regard to the glandular treatment of disease, that this is no new departure; but is simply a revival of a

method of treatment which was sometimes adopted by the Ancients. Be this as it may, it is altogether outside the province of this paper to discuss; but it is a fact that whether the utilization of the various parts of animals be of ancient or of recent origin, this form of treatment is yet in its infancy. For while it is true that the treatment of Myxoedema by extract of the thyroid gland is now thoroughly established, and that, by the inoculation of toxic serum, the mortality of some diseases like Diphtheria has been greatly reduced; nevertheless, there are a number, more or less fatal, which have hitherto successfully resisted

the ingenuity and skill of the physician, but which offer hope of excellent results in the future by some such method of treatment as I have indicated. On the one hand may be mentioned Exophthalmic goitre - and those diseases closely connected with it -, pernicious anaemia, diabetes mellitus, psoriasis, etc; and on the other, diphtheria, cholera typhoid fever, hydrophobia, etc.

Before dismissing the group of Infectious diseases, I may here state, I am inclined to believe - reasoning from analogy - that in the future complete immunity will be procured by inoculation of horse serum; and where the disease

has already started, the symptoms will be greatly modified. In several of the Infectious diseases, as Diphtheria, the bacillus has been isolated, and pure cultivations have been obtained; but in many others this has yet to be achieved. In my opinion, the discovery of the bacillus in each Infectious disease is only a matter of time, taking into consideration the improved methods of research which are now at hand. If such a theory should prove correct, it is questionable, especially in the less fatal and more prevalent diseases that flesh is heir to, as Measles, Scarlatina, Erysipelas, etc. whether people would submit to inoculation; but it is possible

that by such treatment, after the disease has been contracted, the symptoms might be considerably modified or cut short. There is here, I firmly believe a vast field for research for those who have the time, ability and opportunity to follow this particular study.

The subject which I have chosen as a thesis for the degree of Doctor of Medicine, namely, "the pancreatic treatment of diabetes mellitus," is one which has deeply interested me for a number of years. Hitherto, the results of treatment have been, generally speaking, most unsatisfactory, and in those cases where improvement has been noted, or where the disease has dis-

appeared, there arose in one's mind the uncomfortable feeling that it was due = not to any particular line of treatment which had been adopted; but rather to some inexplicable freak of Nature; for when the same form of treatment was followed in subsequent cases the result was generally an utter failure.

Dr Bristowe, in his Theory and Practice of Medicine, says "the treatment of diabetes is a subject of great importance and interest, and has been regarded and conducted from all points of view with varying degrees of success. As with most other diseases, some cases are so serious from the beginning, and so

rapidly fatal that all efforts to arrest their progress are futile; while some cases are so slightly pronounced that the patients either remain in fair health in spite of their sugary urine, or appear to derive benefit from almost any treatment. Between these extremes lie the great majority of cases, which, if not admitting of cure, undoubtedly by appropriate treatment often admit of important alleviation.

Attention to bodily hygiene, careful regulation of the patients diet, and the administration of opium or codeia are apparently the lines of treatment which have hitherto met with most success; but after all is said and done, one cannot help feeling that there is a large percentage of cases over which

drugs have very little influence, or at best only a temporary control; and that sooner or later - generally sooner than later - the disease ends fatally. One readily recognizes the serious view which all medical examiners for Insurance hold with regard to this disease by advising their respective companies to refuse all applications of candidates whose urine show persistent traces of sugar - even though slight. The extreme caution exercised by the profession in this respect is probably due to the knowledge that a mild case of diabetes may ultimately rapidly develope into a most serious one; and in my opinion a person who exhibits slight traces of albuminuria is more

likely to reach his average duration of life, than one who has slight but persistent traces of sugar in his urine.

Probably, one of the principal reasons why the treatment of diabetes has previously been so unsatisfactory arises from the fact that its etiology and pathology have been so obscure, or only imperfectly understood. Its cause is generally attributed to shock, accidents of various kinds, or to mental disturbances; but in the vast majority of cases, no cause whatever can be discovered. It may occur at almost any age, and in both sexes, though more common in males than in females. When the various organs of the body are examined after death, most writers are

agreed that the pathological changes are very inconsistent. Except those changes which might be expected to arise from a long continued, wasting disease, nothing very much can be detected. Some have found evidence of inflammation and atrophy in the pancreas, some cirrhosis of the liver, while again structural changes have been discovered in the central nervous system. Claude Bernard was the first to experimentally show that by puncture of the floor of the fourth ventricle, artificial diabetes could be produced; and many hold the belief that there must be some close connection between diabetes and the central nervous system, since irritation or

division of certain tracts leads to dilatation of the hepatic vessels and to glycosuria.

Dr James, in a paper read before the Edinburgh Medico-Chirurgical Society, pointed out that in thirteen cases of diabetes, the blood showed an increase in the number of corpuscles and richness of haemoglobin without increasing its specific gravity. He contended that this was due to an effort on the part of the organism to make up for the great loss of oxidising material to the tissues by increasing the oxidising power of the blood. In support of this view, he pointed to the effect of starvation, the loss of corpuscles and haemoglobin being small in proportion to the other tissues of the body. Additional evidence was found in the digestive powers of diabetics; he thought

Nature tried here to make up for the loss of oxidising material by increasing the primary digestive power.

From what I have gathered from a study of diabetes mellitus, I think there is no disease which is richer in clinical and experimental literature, and many opposite views have been expressed with regard to its pathology. Bouchard has stated there are no fewer than twenty-seven different theories of the cause of diabetes, of which none, he thinks, are entirely satisfactory. Within the last few years, however, a decided advance has been made by experiment, and by post-mortem examination in clearing away some of the obscurity which has previously overhung the pathology of this disease, and there is

every hope that in the near future this interesting and puzzling disease will be better understood. So much, however, has been written in recent years on diabetes by physiologists, that the importance of the disease from a practical standpoint has been in some measure neglected. While far from regarding physiological experiment as of little importance, there is the danger of considering a frog with its spinal cord divided, or a rabbit with its medulla injured as really and truly a case of diabetes.

While, however, there is abundant evidence that in all cases the seat of origin is not confined to any particular organ, experiment has proved beyond doubt, that the pancreas is the one which is

most commonly at fault. Prof. Hansemann, at the Eleventh International Congress, stated that in his opinion, while diabetes might exist without morbid disease of the pancreas, fifty percent of all cases of this disease are associated with disease of this organ. Dr. Vaughan Harley places the percentage much higher, for he shows that in only three out of twenty-four cases was any other organ - which might have produced diabetes mellitus - affected, showing a percentage of no less than 87.3 in which the pancreas could alone account for this disease.

When we come to the pathological evidence obtained by experiment, we have abundant proof that in the majority of cases the pancreas is

intimately connected with this disease. According to von Mering and Minkowski (Arch. f. exp. Path. u. Pharm. vol xxvi, 1896 p 371) - whose experiments have been verified by many other able observers - complete removal of the pancreas is followed by diabetes of a severe form. The complete results of the experiments of these observers may be formulated thus:-

1 Complete removal of the pancreas is followed by all the symptoms of diabetes.

2 When the animals operated upon recover from the immediate effects of the operation, they suffer from polyphagia, polydipsia, polyuria, and glycosuria, as well as an increased excretion of nitrogen by the urine.

3 In spite of being well fed, the animals rapidly lose flesh and become extremely weak.

4 Frequently they pass into a state of collapse or coma immediately before death.

5 In some cases there is a diminution in the amount, or complete disappearance, of the glycosuria immediately before death.

6 Glycosuria does not follow ligature of the pancreatic ducts unless atrophy of the gland is present.

7 Glycosuria does not follow partial removal of the pancreas.

8 Complete ligature of all the blood and lymph vessels produces diabetes.

Lépine and Barral (Lyon. méd. 1889 p 619. 1890 pp 83-86) show that: —

1 If glucose be mixed with healthy blood, and the mixture be kept at about 38°C for about an hour, a large part of the glucose will disappear; if, however, the blood be derived from a dog, rendered diabetic, the loss of sugar will be almost nil.

2 If chyle be used instead of blood, the loss will be much greater — nearly double.

3 Normal blood, when allowed to stand, loses more sugar than that of a diabetic dog, in which the loss is almost nil. This loss increases to some extent with rise of temperature, but at 57°C it ceases.

4 The loss is ten percent greater in spring than in summer.

5 Defibrinated portal blood taken from an animal killed during active digestion loses at least twenty percent more sugar in a given time than blood from the splenic artery of the same animal.

6 In the case of a dog rendered diabetic, the loss is generally inappreciable; - it very rarely amounts to one-sixth of that of normal blood.

7 Carbonic acid has an important influence in retarding this loss, which, however, is not prevented.

8 If blood from a normal animal be made to circulate through a kidney, it will lose in an hour fifteen percent more sugar than if left to

itself. In the case of a diabetic dog, this difference is only six percent.

Those investigators explain the above facts by assuming the existence of a glycolytic ferment in normal blood; the diminution of this substance in diabetes; the greater amount of ferment in the portal blood, and in chyle than in splenic or arterial blood; an influence of temperature, and of carbonic acid on this ferment; and an influence of the tissues upon the destruction of sugar in circulation in the blood. This glycolytic ferment, they hold, is continually being formed in the pancreas and poured along with the lymph streams into the general circulation, there to destroy the sugar. Of course, the existence of such a fer-

ment in the blood, or the power of the pancreas to create it is purely hypothetical; for, so far as I am aware, it has never been separated; but if it could be isolated, and could be proved by experiment to have the physiological properties which these investigators assume, it would tend to strengthen their theory and clear up to some extent the pathogenesis of this interesting and puzzling disease.

Some three or four years ago, when the treatment of Myxoedema by extract of the thyroid gland was beginning to excite interest and to attract the attention of the medical profession throughout the world, it occurred to me, as the pancreas - ac-

cording to the investigations of eminent observers - is in such a large majority of cases the seat of the disease, that if the fresh raw pancreas of an animal, such as the sheep - or an extract of it - were administered, it might meet with some degree of success. I was unaware at that time of the experiments which had been performed on animals to prove the existence of a glycolytic ferment, but it occurred to me that by some change in the function of the pancreas, there was a "something" which was not being supplied to the blood necessary for the destruction of the sugar. I argued in my own mind that by administering the raw pancreas of a sheep, this "something" might be supplied to the blood, or might have

the power of restoring the function of the gland. Where disease of the pancreas was actually present, I was in hope that by this treatment, it would be arrested; and as Nature has provided us with considerably more glandular tissue throughout our bodies than is absolutely necessary for the proper working of the economy, there might still remain sufficient tissue for the maintainance of health. The postmortem appearances and the results of experiment on the pancreas strengthened me in my opinion, and made me doubly anxious to try this form of treatment; for it has been shown that glycosuria does not follow partial removal of the gland. Surgeons also have proved that if only one testicle or one ovary

be removed from the body, it is still possible for the procreation of the species to be carried on. If, therefore, this form of treatment were to cut short the symptoms of diabetes, and prevent a pathological change from extending to the remaining healthy gland, there might be sufficient tissue left to carry on its function. Of course, where atrophy was present, death would likely take place before the whole gland was involved, so that, under such an assumption, one would naturally infer that those cases which presented themselves for treatment had still sufficient glandular tissue left.

About this time, others were beginning to turn their attention in a somewhat similar direction, and their results, of somewhat variable character, I admit, were published from time to

time in the medical journals.
Fortunately, I was able to pursue this subject over a considerable period by meeting with one or two cases of diabetes in my practice. They are as follows:-

Case I. A. B. aged 27 years, boot and shoe manufacturer, came to me complaining of weakness and loss of flesh. He looked emaciated, and had rather an anxious, careworn expression. There was no pain present, but he told me he had great thirst, and a constant desire to micturate, passing large quantities of urine at each time. These symptoms he had perceived coming on for several months; but he dreaded consulting a doctor for fear he should be told he was suffering from diabetes,

as his father had died from that disease at the age of fifty-five. He felt, however, he could attend to his business no longer on account of his excessive weakness. His heart and lungs were healthy; the tongue was dry but inclined to be red, especially towards the middle line, and his skin was dry. I asked him to pass me a sample of urine; it was pale in colour, and had the characteristic odour of diabetes. The specific gravity was 1040, very acid, and contained a large quantity of sugar - roughly, about 65 grains to the ounce. I ordered him to bed for a few days, and partially, but not to any great extent, restricted his diet, - in fact, in none of my cases

how I found it necessary to adhere to the strict rules with regard to diet which are generally laid down in text books on this subject. I went to his butcher and arranged that he should supply my patient with a fresh pancreas of the sheep twice a week. This was finely minced up, and mixed with some vegetables also in a raw condition, so as to make a sort of salad; but my great difficulty was to make the dish palatable. I have since found it can be taken, even with a certain amount of relish, by mixing the finely minced gland with gravy or extract of meat, and, if necessary, bread crumbs. Half a gland was to be taken at a time, and his weight, before commencing the treatment, was

9 stones 5 lbs. There was very little improvement during the first week or two, except a diminution in thirst and quantity of urine passed; but soon after this his symptoms began gradually to improve, the sugar to disappear from his urine, and at the end of three months all traces of the disease had gone. His weight increased to 10 stones 7 lbs. he was rather a spare man at best. and he ultimately regained his usual strength. For about a year, I was able to keep this case under observation, during which there was no return of the disease, but he ultimately left the town, and could not be traced.

Case II. J. T. aged 45, shoemaker,

presented himself for examination May 10th - 1893 as a candidate for insurance. He was prematurely grey, of pale complexion but otherwise of healthy appearance. He answered the questions on the examination form satisfactorily, and the stethoscope revealed nothing abnormal with regard to the heart or lungs; but when I came to examine his urine, I found it was of the specific gravity of 1030 with a decided trace of sugar. Of course his application was refused; and when he learned the cause, he afterwards placed himself under me for treatment. He had been at this time passing fairly large quantities of urine daily. Afterwards learned, but according to his statement, he had not lost very

much weight. Whether his statement was absolutely true - he was in financial difficulties at the time - and the case was merely one of transient glycosuria, or whether it was one of those early cases of diabetes, I cannot say; but I began the pancreatic treatment at once. He had, I may say, in addition to the gland, a tonic of bark. The particulars of the examination of his urine from time to time are as follows:—

16 May 1893.

Sp. gr. 1030. very acid; no albumen; 20 grains of sugar to the ounce; quantity of urine passed in 24 hours, 5 pints.

20 May

Sp. gr. 1006, very acid, very pale,

sugar 5 grains to the ounce; quantity of urine in 24 hours, 4 pints.

23 May

Sp. gr. 1026, very acid; sugar, a trace; large quantity of pink urates; quantity of urine in 24 hours, 3 to 4 pints.

30 May

Sp. gr. 1010; slightly acid, sugar a trace; no urates; quantity of urine in 24 hours about 3½ pints.

4 June

Sp. gr. 1010, slightly acid; sugar none; quantity of urine in 24 hours 3 pints.

11 June

Sp. gr. 1020; slightly acid; sugar none, quantity of urine in 24 hours, 3 to 4 pints.

25 June

Sp. gr. 1020; very acid, sugar none.

One point of peculiar interest about this case was the rapidity with which the specific gravity fell from 1030 to 1006, and it was some considerable time before it rose to the normal specific gravity of 1020.

Case III. On the 12th October, 1893, J. K. aged 55, railway man, consulted me. He complained of great prostration, loss of flesh, was passing large quantities of urine daily, had great thirst - in short, he had all the principal symptoms of diabetes. There was no history of an accident or shock; he was a total abstainer, and had always lived a most regular life. There was no family history of diabetes, and it was naturally a great shock

to him when he knew he was suffering from that disease. His urine had a specific gravity of 1040, was very acid, and showed a large percentage of sugar. Realizing the serious nature of the disease from which he was suffering, I had very little difficulty in persuading him to give the pancreatic treatment a trial. There was no albumen present, and the rough notes I have of the examination of his urine are as follows:-

12th Oct. 1893

Sp. gr. 1040; very acid, sugar 35 grains to the ounce.

14 Oct.

Sp gr. 1040; very acid; sugar 35 grains to the ounce; weight 13 stones 9½ lbs; quantity of urine in 24 hours, 4½ pints.

21st Oct.

Sp. gr. 1040: very acid; sugar 35 grains to the ounce; weight 13 stone 7½ lbs; quantity of urine in 24 hours, 3 pints.

28 Oct

Sp. gr. 1038; very acid; sugar, 30 grains to the ounce; quantity of urine in 24 hours, 3 pints.

4 Nov.

Sp. gr. 1038; very acid; sugar 30 grains to the ounce; weight 13 stones 11½ lbs; quantity of urine, 2 ½ to 3 pints.

11 Nov.

Sp. gr. 1034; very acid; sugar slight; weight 13 stones 13 lbs; quantity of urine in 24 hours 2 ½ to 3 pints.

18 Nov

Sp. gr. 1030; sugar, none; weight 14 stones 2 lbs; quantity of urine in 24 hours 2 ½ to 3 pints.

2nd Dec

Sp. gr. 1028; sugar none; weight 14 stones 3 lbs; quantity of urine in 24 hours 2½ pints

I have been able, fortunately, to keep this case under observation up till the present time – a period of about 2½ years – during which there has been no return of the disease. His urine is carefully examined periodically for sugar, but though not the slightest trace has been detected since it disappeared about Nov. 18th 1893, there is still a tendency for the specific gravity to remain above the normal. His weight in Nov. 1894 was 14 stones 7 lbs, and at the present time about 15 stones. In this case there was considerable difficulty in getting rid of the last traces

of sugar, and acting upon a suggestion which appeared in the British medical journal about that time, I gave the raw testes of the bull finely minced. This had the effect of clearing up the last traces of sugar in about a week; but whether this was a mere coincidence, or whether, had the raw pancreas been continued a little longer, it would have disappeared, I have not been able to verify, as I have met with no further cases of diabetes in my practice, - except one. This was a widow lady, who was given to intemperate habits and would not continue the treatment after the first trial.

If the testes of the bull, however, have the power of removing glycosuria, then

to my mind, it would tend to show that there is some property in common between the various glands of the body apart from their ordinary physiological one; or, to put my meaning more clearly, a particular gland may be beneficially employed in several diseases. As an example of this, we have only to note in how many diseases, besides Myxoedema, the thyroid gland has been employed from time to time, and - if we are to believe the various statements which have appeared - with benefit. I am inclined to believe that all the principal glands have some therapeutic property which in the future will be found to have an influence over certain diseases.

So far, I have always preferred to use

the raw gland to the tabloids or to the extract, because I am always sure to get it perfectly fresh in this form, and therefore likely to get consistent and reliable results. In all my cases the first symptoms to improve were thirst and a speedy diminution in the quantity of urine. Accompanying this there is a general feeling of well-being; the strength improves and there is often a decided gain in weight, even before there is any appreciable difference in the amount of sugar.

Dr. W. Hale White published the results of two cases of diabetes (British Medical Journal 1893 page 432) which he had treated with raw pancreas, and with Lig. Pancreaticus hypodermically. He, however, arrived at the conclusion

that it is very doubtful whether feeding on raw pancreas or subcutaneous injection of Liq. Pancreaticus is of any benefit in diabetes mellitus. Neither appear to him to have any influence on the quantity of urine, its specific gravity, or the urea; perhaps, he thinks, they decrease the amount of sugar passed, and very slightly increase the weight and feeling of strength.

Dr Hector Mackenzie (British Medical Journal 1893 Jan 14th), while doubting if Liq Pancreaticus given by the mouth in diabetes would be the means of curing or arresting the disease, admits he derived some benefit in his cases. In his two cases, the feeling of lassitude and langour disappeared

and they felt stronger in every way. Their thirst had considerably lessened and they had passed a smaller quantity of urine. The specific gravity of the urine and the relative amount of sugar were not, on the other hand, affected.

Dr Neville Wood, in the same number of the Journal, expresses a somewhat similar opinion; but they are all more or less agreed that feeding by the raw pancreas, or the administration of the Liq Pancreaticus, – if it did not influence the specific gravity of the urine or lessen the amount of sugar – improved the condition of the patient in other respects. Undoubted, it has the effect of diminishing the thirst,

and the amount of urine excreted, and under this treatment the patient generally increases in weight. In short, he feels considerably better, and is able to continue his work again, and in a disease like diabetes we must be thankful for small mercies.

I am at a loss to understand how it is I have met with such success in the treatment of my cases, compared with others, since the lines of treatment are practically identical. My cases were not selected ones, but for all that they may have been true cases of pancreatic diabetes; and the results which I have obtained encourages me to adopt this treatment in any future ones which may arise in my prac

tice. Judging from the results of others, I am not so hopeful as to assume that in all my subsequent cases of this disease I shall meet with such success as I have done in the past; but as this form of treatment is yet in its infancy, I feel it my duty under the circumstances to give it a fair trial.

Since the above was written I have met with the following case. It is still under treatment.

Case IV. S. P. aged 17½ years, clerk, came on the 7th April 1896 to my surgery complaining of diabetes mellitus. He knew he suffered from this disease, for he was treated in Sheffield for it before

coming to Leicester. The disease was discovered about four or five years ago and his uncle on his fathers side suffers from diabetes. His tongue is not red, but the skin is dry. His weight is four stones six pounds, but he knows he once weighed considerably more. The bowels are regular, there is great thirst, and he passes large quantities of water daily. His forehead is wrinkled, and though he is 17½ years old & has an old appearance he is no taller than a youth of 12 years. His height is 4 feet 6 inches. Analysis of urine before treatment:-

7th April 1896

Sp gr. 1036; very acid; no albumen; sugar 30 grains to the ounce.

He was recommended to come to me by Case III, but owing to a difficulty at first in procuring the fresh pancreas he was not able to begin the treatment till the 11th April.

18th April.

Sp. gr. 1040: very acid; weight 14 stones 7 lbs; sugar 30 grains to the ounce; quantity of urine in 24 hours 6 to 7 pints.

25th April

Sp. gr. 1040; very acid; sugar 27 grains to the ounce: quantity of urine in 24 hours:-

Apl 20 ..... 6 pints	Apl 23 — 3½ pints
" 21 ..... 5 "	" 24 — 4¾ "
" 22 — 5 "	

He already feels very much better, and has very little thirst.

2nd May 1896.

Sp. gr. 1040, very acid, sugar 30 grains to the ounce, quantity of urine in 24 hours:-

27th Apl —	4½ pints	30th Apl —	4½ pints
28 " —	4¾ "	1st May —	4⅝ "
29 "	4¾ "		

9th May 1896

Sp. gr. 1040, very acid, sugar 30 grains to the ounce, quantity of urine in 24 hours:-

5th May —	5 pints	8th May —	4⅜ pints
6th May —	4½ "		
7th May —	4¾		

16th May 1896

Sp. gr. 1040, very acid, sugar 30 grains to the ounce; quantity of urine in 24 hours:-

12 May —	4¾ pints	14 May —	4½ pints
13 " —	4⅜ "	15 " —	4½ "

23rd May 1896

Sp. gr. 1040, very acid, sugar 30 grains to the ounce, quantity of urine in 24 hours:-

19th May —	4½ pints	21 May —	4¾ pints
20th May —	4⅜ "	22 " —	4½ "

His weight still remains 4 stone 7 lbs. and

the abdominal measurement is 35 inches.
He has lost all the languid, weary feelings he had in the mornings. Previous to the commencement of the treatment he had to take the tram to and from his business, but now he is able to walk the distance twice daily with not the slightest degree of discomfort or fatigue; and where formerly he had on many occasions to remain at home for days on account of his weakness, he is now able to attend to his duties regularly. He has lost his pasty complexion, and does not look so wrinkled. He can retain his urine for about three hours at a stretch, whereas formerly he was compelled to micturate every hour.

A peculiar condition of the abdomen, attracted my attention early in this case. It was abnormally large for his stature,

measuring in the erect position 25½ inches in circumference, 1½ inches below the umbilicus. The superficial epigastric veins were very much distended, and the abdomen was tympanitic over a large area. There was some ascitic fluid towards the flanks which altered its position according to the posture of the patient, and the lower border of the liver extended 1½ inches below the ribs; but a point of peculiar interest was discovered below the liver and in the region of the head of the pancreas. Here there was a circumscribed area about 3 in. × 4 in., having a distinctive tympanitic note from that of the rest of the abdomen. When percussed, it sounded like an empty wooden barrel being tapped with a hard stone. No hard substance of the nature of a tumour can be detected, and his mother states that this condition of the abdomen has existed for years. This must necessarily com-

plicate the diabetes. He was a delicate child at birth, suffering then from "yellow jaundice", and there is no trace, as far as I can discover, of congenital syphilis.

In conclusion, as the case is still under treatment, I am sorry I cannot give the final result; but I would point out that though there is no decrease in the specific gravity nor in the amount of sugar at present, there is a substantial reduction in the quantity of urine excreted in the twenty-four hours, a great diminution in the thirst, no further loss of weight, a decided gain in strength, and altogether a steady improvement in the general condition of the patient - facts which are borne out by the previous cases. The patient now consumes one gland daily.